Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

Reserve
A321.9
R31

ARS 62-8
5c
August 1958

LIBRARY
CURRENT SERIAL RECORD
★ SEP 15 1958 ★
U. S. DEPARTMENT OF AGRICULTURE

3

Exploratory Studies of Measuring Money Savings and Time Costs of homemade clothing

UNITED STATES DEPARTMENT OF AGRICULTURE
7(U.S. Agricultural Research Service
ARS 62-8)

This report presents some of the problems encountered in recent research concerned with one aspect of home production--the economy of home sewing. A summary of the findings on the time and money costs of making garments at home is included. Information on these costs was reported in somewhat more detail in Rural Family Living, April 1956 and October 1956. This report is intended primarily for those who direct research in home economics, both in household management and in clothing construction.

The project involved the making of three types of dresses similar to ready-to-wear garments available on the market; the work was done in a laboratory under conditions simulating those of home sewing. The experimental procedures and the various problems arising from the project are discussed, including the underlying reasons for various decisions that were made. Some of the unsolved problems and areas where further research would be desirable are indicated.

The study was conducted jointly by the Household Economics Research Division and the Clothing and Housing Research Division.

EXPLORATORY STUDIES OF MEASURING MONEY SAVINGS AND TIME COSTS OF HOMEMADE CLOTHING

~~By~~ Margaret L. Brew[1] and Carol M. Jaeger
Household Economics Research Division
and
Margaret Smith, Clothing and Housing Research Division

Home sewing has long been regarded as a way in which the homemaker can contribute to the family's nonmoney income. However, with increasing manufacturing efficiency and the economies of large-scale production of clothing, many home economists are questioning whether or not money is saved by producing some of a family's clothes at home, and, if it is, whether the amount is sufficient to justify the time required.

To provide a first step in determining if money is saved by sewing at home, we experimented with procedures for estimating money savings and time costs of home-produced clothing. Essentially the project was one of making in our laboratories dresses similar in style and construction to those purchased ready-to-wear, determining the time used in construction, and comparing the money costs of the readymade and homemade garments.

The project consisted of separate studies covering each of three types of garments--housedresses, street dresses, and children's dresses, all of cotton. Ready-to-wear dresses were chosen from those meeting specifications of the Bureau of Labor Statistics for its Consumer Price Index. In pricing, the BLS follows specifications developed from studies of the purchasing practices of urban wage earners and clerical workers. The stores chosen for pricing were those catering to persons in this group.

To arrive at answers to the question of whether money could be saved and the relation of any money saving to time spent in making the garments, experimental procedures needed to be developed. The aim was to put as many of the procedures as possible on an objective basis, so that the experiments could be repeated by other research workers and also be done for other garments. The research problems involved proved to be even more numerous than at first anticipated. To assist other research workers who may be contemplating investigations of this type, not only for home sewing but for other types of home production as well, the major decisions involved in the experimental design and the more important of the procedures developed are reported here.

MEASURING MONEY SAVINGS

Type of garment and price range.--The first decision to be made in planning research on costs of ready-to-wear and homemade clothing concerns the types and price ranges of the garments to be compared. The three types of garments chosen for the study were selected because they are among the types most commonly made at home. The use of the Bureau of Labor Statistics specifications for garments included in their Consumer Price Index provided the opportunity to narrow the choice of the individual garments both as to type and as to price range. The garments selected for pricing by the BLS are in the range of prices commonly paid by moderate-income urban families.

---

[1] Now with New York State College of Home Economics, Cornell University

The use of the BLS specifications for the selection of the ready-to-wear garments also greatly simplified the sampling problem. Within a given city priced by the BLS, the various individual garments that met the BLS specifications and were available in stores at the time of the study could be sampled on a systematic basis. Had it been necessary to sample all daytime dresses, for example, or even all cotton daytime dresses, the sampling problem might have become so highly complicated that it would not have been feasible to carry out.

Because each of the types of garments was purchased only in one marketing area, the findings apply only to that area. This is probably not a serious limitation. However, to round out research projects of this type possible regional variations should be checked.

Choice of styles for cost comparison.--The next important decision concerns the choice of the individual homemade and ready-to-wear garments for the cost comparison. One procedure is to select ready-to-wear garments and duplicate the styles as nearly as possible with commercial patterns. This is realistic in terms of what a homemaker might actually do. However, even in styles that can be considered remarkably similar, there are frequently important differences that will affect the money savings shown and the time costs. For example, the ready-to-wear garment may have a buttoned closure, whereas the only style available in commercial patterns that is similar in other design and construction features may call for a slide-fastener closure, thereby usually increasing the money costs. If many sets of garments are compared, the problem of selecting strictly comparable commercial patterns is less acute.

For daytime dresses and children's dresses, the commercial patterns available at the time of the study were reasonably close in style and construction features to the ready-to-wear garments, in the opinion of the project leaders. Consequently the procedure of using commercial patterns to make garments comparable to the ready-to-wear garments was followed for these two types of garments.

Commercial patterns for dresses called housedresses, however, were found to be very different in style from ready-to-wear housedresses. Although patterns similar to the ready-to-wear garments could have been obtained from among commercial daytime dress patterns, we decided to restrict the choice to patterns specifically called housedress, and to sample independently both the ready-to-wear housedresses and the commercial housedress patterns.

Another method of selecting garments for comparison is to sample ready-to-wear garments on the market and duplicate them as closely as possible in the laboratory by using patterns prepared from ripped-up models of the ready-to-wear dresses or by modifying commercial or basic patterns. The first of these procedures is unrealistic in terms of how a homemaker would act, but the comparison is clear-cut in terms of research and readily understood. An assessment of money costs for the pattern or of time costs in its preparation needs to be made for either of these procedures.

In our project we used patterns made from ripped-apart ready-to-wear housedresses as well as a sample of commercial housedress patterns in order to compare time and money costs resulting from the two methods. The money savings were found to be considerably less and the time costs greater for the garments made from the commercial pattern; the commercial pattern housedress styles required more fabric, more costly findings, and more time-consuming construction methods.

Quality of fabrics and findings.--For a precise comparison of money costs, it would be desirable to use fabrics in the homemade garments exactly like those used in the ready-to-wear garments, but these are seldom available at the retail piece goods counters. For these studies piece goods were purchased to match those used in the ready-to-wear dresses with respect to color, weave, finish, and construction. However, it was not always possible to find piece goods that resembled closely the fabrics in the ready-to-wear dresses. For example, the least expensive percales available in piece goods at the time the housedresses were purchased appeared to be of better quality than some of the fabrics in the ready-to-wear. However, we were not able to prove by laboratory tests that there was a significant difference between the two sets of fabrics in characteristics associated with satisfaction in use. Although laboratory tests showed that the number of yarns per inch was lower in some of the individual ready-to-wear dress fabrics, the mean for the group as a whole was not significantly lower than the mean for the piece goods group. Laboratory tests of other properties associated with satisfaction in use, such as breaking strength, bursting strength, color fastness, and shrinkage, showed no significant differences between the means of the percales bought by the yard and the fabrics in the ready-to-wear dresses. The tests for each of the two groups showed considerable within-group variability, probably more for the ready-to-wear than for the piece goods, and this may have accounted for the fact that the means were not significantly different.

Few testing procedures are available for determining quality of sewing materials other than fabrics and thread. By eye inspection alone many of the findings available to the home sewer, particularly buttons, appeared not to be of the same grade as those used in the modal priced ready-to-wear housedresses and daytime dresses. Accordingly, in choosing the materials for the homemade garments the research worker is frequently faced with the alternative of items that will destroy the comparison either on the basis of color or style or on the basis of probable durability.

Size of garment.--Another factor that will affect the research findings is the size of the garment used in the experiments. Garments of the same style in sizes 14, 16, 18, and 20, for example, are usually priced the same on the retail market, yet more fabric is likely to be used and more time spent in making the larger than the smaller garments. To determine the general magnitude of differences due to size, we made the garments in the daytime dress and housedress experiments in two sizes, 14 and 20. The results are shown in table 1.

Table 1.--Money and time costs and money savings, average for 5 styles of dresses

Type and size of dress	Money cost	Time cost 1/	Money savings
	Dollars	Hours	Dollars
Housedress:			
Ready-to-wear	3.45	--	--
Constructed in laboratory--			
To duplicate ready-to-wear--			
Size 14	2.32	1.5	1.13
Size 20	2.36	1.5	1.09
From commercial pattern 2/--			
Size 14	2.84	2.0	.61
Size 20	3.01	2.2	.42
Daytime dress:			
Ready-to-wear	10.15	--	--
Constructed in laboratory from commercial pattern 3/ --			
Size 14	5.24	2.9	4.91
Size 20	5.56	2.9	4.59
Children's dress (size 8):			
Ready-to-wear	4.39	--	--
Constructed in laboratory from commercial pattern 3/	2.23	1.9	2.16

1/ Estimated on the basis of 2 dresses for each style or 10 dresses for each size group.

2/ Sample of commercial patterns available. The styles were not similar to the ready-to-wear housedresses.

3/ Commercial patterns similar in style to the ready-to-wear garments (matched garment by garment) were selected.

The money costs for the size 20 daytime dresses were significantly greater statistically than those for the size 14. Time costs for the housedress duplicates and the dresses made from commercial patterns were both statistically greater for the size 20 than for the size 14. However for the housedress duplicates the difference in time needed to show statistical significance was only 2.7 minutes, and this was not considered to be of practical concern. (As the figures in table 1 have been rounded to tenths of an hour, they do not show any difference in the times of construction of the housedress duplicates.) Thus, though not all the differences were significant, it would probably be well to concentrate future experiments first in the more commonly used sizes and explore variation due to size when more carefully controlled experiments can be planned.

A decision also needs to be made as to whether the cost account entries should be in terms of purchasable amounts or in terms of amounts actually used.

For example, piece goods are sold usually in given portions of a yard. So, if only 1 inch over a yard is needed, should the measure to an eighth of a yard be included? A decision must also be made on the cost of thread, buttons, and other trimmings, where a lesser amount may be needed than is usually available for sale. In our experiment, cost estimates were based on purchasable amounts throughout.

Cost of equipment used.--Some decision regarding inclusion of the cost of equipment must be made. Should part of the purchase cost of the sewing machine, iron, and ironing board be assigned to the making of each dress? One can argue that these items are usually owned anyway for mending, pressing, and routine laundering, or, if they are used only for sewing, that the number of garments made with them is so great that the added cost for use in making one garment would be insignificant. However, such an argument would not be justified for all families nor would it be as defensible for less used equipment such as a hemmer. Estimates of electric power costs can be assigned, but they are so small that their inclusion or exclusion would not affect the findings materially. Some accountants would argue that the overhead costs of lighting, heating, and room rental should be charged, since the garment manufacturer has to include these in his cost account. Again, should one ignore the overhead costs on the basis that the family would incur them anyway so that their marginal cost for home sewing is zero?

In our experiment we assumed that the equipment was used enough and over a long enough period of time so that the costs prorated to the garments made would be negligible. However, equipment used relatively little would add significantly to the cost of single garments. We also assumed that the work was done in rooms provided for other purposes, therefore included no estimates for rental, heating, or lighting.

Money savings.--The conclusion drawn from these brief experiments is that money can be saved by home sewing even for low-priced garments such as housedresses (table 1). The data on size 14 housedresses show that money savings per garment were about $1.10 for dresses constructed in the laboratory to duplicate ready-to-wear housedresses and over 60 cents for those made from a sample of available commercial patterns. Apparently the prices paid by commercial firms in volume buying of piece goods and findings are not enough lower than the retail prices paid by the homemaker to outweigh the labor costs of the ready-to-wear dresses.

The money savings were greater for children's dresses than for housedresses, and still larger for cotton daytime dresses. These findings suggest that savings for home sewing increase with the retail price of the garment. This conclusion is supported by market research showing that labor costs take a larger share of the total manufacturing cost of high-priced than of low-priced clothing.

In terms of time spent the money savings proved to be appreciable for the daytime dresses in our laboratory experiments performed by skilled seamstresses. Though the money savings per hours spent were less for children's dresses and for housedresses, they are probably sufficient to induce many homemakers with considerable sewing skill (equal to that of the laboratory seamstresses) to use their time for such a purpose. Busy homemakers with little skill in sewing might question their use of time for home sewing. Furthermore, there is a limit to the total amount of money that can be saved by home sewing, the limit being determined by the number of garments that the family ordinarily acquires of the types that the homemaker can make.

MEASURING TIME COSTS

Satisfactory methods for determining time costs proved to be more difficult than for measuring money savings. Furthermore, because we know little about the skills of a homemaker and the conditions under which she works, we are less sure that the time results of the laboratory experiments have wide application.

Type of equipment and its arrangement.--In determining time costs in the laboratory the first decision the research worker needs to make is what type of equipment is to be used and its arrangement. Whether an electric or a foot-treadle sewing machine is used undoubtedly will affect the time used in construction. Having or not having such equipment as a buttonholer or a hemmer will also affect the results. Clothing construction teachers have long maintained that large cutting tables of suitable height add materially to the ease of cutting out garments, but whether the speed of the cutting operation would be less if the dining room table were employed or the garment were cut on the floor is not known. To proceed with the project we assumed that our laboratory equipment was reasonably like that available in a home where home sewing was commonly done, but we have no evidence to prove this point.

To simplify the experiment we assumed that all equipment was set up ready for work. But if the typical home situation is such that it is necessary to move the sewing machine from one part of the house to another, or to arrange a cutting surface, these and similar operations should be added to the time costs. From the time of starting, the time to make all necessary changes in equipment was included in the experiment. Thus, changing the thread on a sewing machine, changing from a presser foot to a buttonholer attachment and the like were included in the time record.

Choice of construction techniques and quality of construction.--Degree of familiarity with the pattern may account for time differences also. We permitted our seamstresses to study a commercial pattern as a homemaker would do in purchasing it and to read through the instructions before the beginning day of the experiment. From that point on all time spent in looking at the suggested pattern layout, in laying the pattern on the cloth, and reading the instruction chart for specific directions as to construction methods was included in the time record.

One problem proved to be that of deciding what construction techniques should be used. In the experiments in which ready-to-wear garments were ripped apart and duplicated in the laboratory, the procedures to be followed were determined, insofar as possible, from an examination of the ready-to-wear garments. However, in the experiments in which commercial patterns were employed, the decision needed to be made as to whether the worker should follow the techniques presented in the pattern directions or use others that might take more skill but might be less time consuming. We decided to rely on the pattern directions. However, we replicated one style to determine if other methods would have yielded smaller time costs. The style selected was the one, in the judgment of one of the project leaders, that would probably yield the greatest time savings through the use of alternate methods. It was found that the garment could be made in approximately 25 percent less time by using the alternate methods than by following the pattern directions. Obviously, a considerable contribution to the improvement of home sewing could be made in studies designed to measure accurately time costs of alternate construction processes.

We discovered during the experiments that when we permitted the worker to select her own methods she varied the order of construction for dresses of the same style. Whether or not this difference increased the variability of our results we do not know. An alternate procedure would have been to have another worker make very detailed directions for construction order and then have the initial worker follow them closely so that the order would have been constant throughout the experiment. To determine the least time consuming method, supplementary studies of time costs of the various possible orders of construction would need to be made.

Achieving comparable quality of construction is a problem closely related to the choice of construction techniques. In the housedress experiment in which ready-to-wear garments were duplicated as closely as possible, we made every effort to duplicate the type and quality of construction found in the ready-to-wear. An attempt was made to copy width of seams and hems, seam and hem finishes, length of stitch, order of construction, and type of trimming. In the dresses made from commercial patterns we followed the pattern directions as to width of seam, type of finish, etc. Where no guidance was given, such as in length of stitch, again we tried to adhere to the general quality of construction found in the ready-to-wear garments used for comparison.

Problem of fit.--One assumption necessary to proceed with our experiments was that ready-to-wear garments and garments made from commercial patterns with no modification would fit the wearer equally well. To have tested this premise would have been an experiment in itself. Though many women say they make clothing at home because it fits better, there is no basis for determining whether such conclusions are based on garments that have been fitted to the person rather than on garments made from the patterns without additional fitting. If the fitting variable were added to the experiment it would be necessary to include the time for fitting the homemade garment and the money cost for altering the ready-to-wear garment. The research worker would then be faced with two major problems: selecting the person to be fitted on the basis of a modal size, and developing score cards for judging the quality of fit.

Choice of seamstress.--Probably the most fundamental decision in terms of time costs in studies of this type is the choice of the person to construct the dresses. No evidence is available concerning the average sewing speed or skill of homemakers. When skilled seamstresses are used for the laboratory experiments one might assume that the times reported are close to the minimum. An alternative would be to time homemakers of "average" skill (and it would be difficult to define "average" skill).

Recording time and scheduling of work.--In recording the time spent in making the dresses, several approaches were tried. Most satisfactory was the use of a second worker, seated in front of the sewing machine with a clear view of the operator at all times, who dictated the activities and time of the sewer into a dictaphone. The observer was thoroughly familiar with sewing processes so that she could record each step. Time was read from a clock placed where it could be seen readily by the observer but not by the operator; an open-faced clock (without glass) was used because reflections from glass might interfere with quick reading of time. Only the actual working time was recorded; interruptions were excluded. The dictaphone records were transcribed into a running report and subsequently were posted on a specially designed card. This card was designed so that the time used in making a dress could be analyzed both by the various activities involved, such as cutting or stitching, and by the time spent on the various dress parts, such as waist, skirt, collar, and sleeve.

Allocation of the intervening time between specific construction processes also presented a problem. It was decided to assign such time to the process to which it was related. For example, the time required to go from the sewing machine to the ironing board was assigned to "pressing," the time used in picking up garment sections preparatory to putting two edges together for seaming was assigned to "stitching seams." Any necessary ripping and restitching or rethreading of a broken thread in the sewing machine was also assigned to "stitching." The rethreading required by a different color thread, however, was assigned to "machine adjustments."

Because variability might be introduced by day of week and time of day, that is, workers might be slower on Mondays than on Tuesdays and some might be slower in the afternoon than in the morning, we controlled both of these factors in our experiments. The work on the women's dresses was done in summer when both humidity and temperatures were high. Undoubtedly the experiments should be replicated during another season to determine if worker speed is greater when temperatures and humidity are lower.

The ordeal of being observed and timed while working may account for fatigue and emotional excitement in the worker, which in turn may affect the results. We found it highly unsatisfactory to schedule the construction of more than three dresses per week by one worker. A schedule of two garments per week is better, particularly when the experiment is a long one, though it increases appreciably the total time span for conducting the experiment.

In our experiments, though two of the workers served as both observers and seamstresses, we did not use either one as a seamstress for a dress she had observed being made. We did vary observers among the experiments, however, which created some analytical problems.

For the principal laboratory worker used in the experiments, making a number of dresses over a rather long period of time tended to decrease the total time of construction, regardless of the style. This we have termed the "learning process."

For the housedress pattern study, for example, the time spent declined a total of 16 percent in the making of 20 garments. The final figures reported were adjusted to eliminate the learning factor.

Five styles of garments were made in each of the experiments. This number was decided on for reasons that differed in each instance. In the first experiment--duplicating ready-to-wear housedresses--only five styles that met the BLS specifications were available in the shopping area used at the time the purchasing was done. In the second housedress experiment--making housedresses from commercial patterns--the experimental design included a comparison to show differences in the construction time used by two professional seamstresses. With this additional factor, it was felt that five would be the maximum number of styles to undertake, considering fatigue and emotional strain of the workers. The experiments on daytime dresses and children's dresses were held to five styles for a variety of reasons, such as the loss of the second seamstress, the cost of purchasing more ready-to-wear dresses, and the expiration date for the project.

ADDITIONAL CONCLUSIONS CONCERNING EXPERIMENTAL PROCEDURES

1. The method developed in this study for recording times proved to be very satisfactory.
2. The project leaders felt that from several viewpoints probably the most defensible procedure in the choice of garments for comparison was to select commercial patterns as similar as possible in style to ready-to-wear garments.
3. It would seem important to obtain some measure of within-worker variability when laboratory technicians are employed. However, this is a complicated problem and requires both considerable statistical planning and a fairly long-range project.
4. For an experiment of this nature, it is necessary to have specific rules for order of construction. If order of construction is controlled, experiments such as those described here, using trained workers in a constant laboratory situation, should yield considerable valuable information on time costs of the various processes.
5. The relative durability of homemade and ready-to-wear dresses is an important factor in the decision to buy or to make at home and should be explored as a separate project.
6. Studies of this type should be supplemented with construction of garments in the home by homemakers. This would introduce the factors of both the sewing conditions in the home and the skill of homemakers. Considerable difficulty might be encountered in designing such an experiment to ensure that representative home conditions and workers were obtained.
7. We could see progress in evaluating the importance of the variables so that in successive stages we could eliminate some while studying the effect of others. Therefore, the assistance of a statistician from the very beginning of the development of the project was necessary even though the project had originally seemed like a simple one.